

AMENDMENT TO THE CLAIMS

1. (Currently Amended) A method of producing an optical fiber having air holes extending in the axial direction of the fiber, the method comprising:

a first step of preparing an optical fiber preform having through holes to be formed into the air holes;

a second step of drawing the optical fiber preform in a drawing furnace to form an optical fiber having the air holes under conditions where an oxygen gas is present in the through holes, wherein the oxygen gas suppresses the formation of SiO gas; and

a third step of heating the optical fiber to a temperature in the range of 900°C to 1300°C in an additional heating furnace provided downstream of the drawing furnace, such that the bond of SiO that has adhered to the interfaces of the air holes is stabilized to decrease Rayleigh scattering at the interface and to decrease a transmission loss, such that Rayleigh scattering of guided light at the interfaces of the air holes is suppressed.

2. (Original) A method of producing an optical fiber according to claim 1, wherein in the third step, the optical fiber is heated to a temperature in the range of 900°C to 1300°C for 0.1 second or more.

3. (Original) A method of producing an optical fiber according to claim 1, wherein in the third step, the optical fiber is heated to a temperature in the range of 900°C to 1300°C, the temperature being higher than the minimum temperature of the optical fiber located between the drawing furnace and the additional heating furnace.

4. (Original) The method of producing an optical fiber according to claim 3 wherein the additional heating furnace is disposed apart from the drawing furnace so as to air-cool the optical fiber between the additional heating furnace and the drawing furnace.

5. (Original) The method of producing an optical fiber according to claim 1, wherein the atmospheric gas in the drawing furnace contains a helium gas.

6. (Original) The method of producing an optical fiber according to claim 1, wherein the atmospheric gas in the additional heating furnace contains a nitrogen gas.

7. (Cancelled)

8. (Original) The method of producing an optical fiber according to claim 1, wherein in the second step, the optical fiber preform is drawn by heating at a temperature of 1950°C or less in the drawing furnace.

9. (New) The method of producing an optical fiber according to claim 1, wherein the through holes are not etched.

10. (New) A microstructure optical fiber product produced by the method of claim 1, comprising:

air holes extending in the axial direction of the fiber product,

an atomic arrangement at the interfaces of the air holes having small amounts of disorder, such that the fluctuation of a dielectric constant is decreased, Rayleigh scattering is decreased, and a transmission loss of the fiber product is increased.

11. (New) The microstructure optical fiber product of claim 10, wherein the air holes are arranged in a hexagonal pattern.

12. (New) The microstructure optical fiber product of claim 11, wherein the innermost set of air holes comprises six holes, and the second innermost set of air holes comprises 12 holes.